Water Resource Room

NABR

DRINKING WATER SOURCE PROTECTION PLAN

Natural Bridges National Monument

December 2000

Prepared by:
Larry Martin
National Park Service
Water Resources Division
1201 Oakridge Drive, Suite 250
Ft. Collins, CO 80525
(970)-225-3515

WATER RESOURCES DIVISION

National Park Service - Department of the Interior
Fort Collins - Denver - Washington

March 3, 1849

United States Department of the Interior

NATIONAL PARK SERVICE
Water Resources Division
1201 Oak Ridge Drive, Suite 250
Fort Collins, Colorado, 80525-5596

REPLY REFER TO:

December 20, 2001

Kate Johnson
Utah Department of Environmental Quality
Division of Drinking Water
P.O. Box 144830
Salt Lake City, UT 84114-4830

Subject: Drinking Water Source Protection Plan for sources at
Natural Bridges National Monument, System No. 19044
Well No. 2 (Old) Source No. 01
Well No. 3 (New) Source No. 02

Your letter of October 22, 2001 requested that Highway 275 in the vicinity of the water supply wells be included in the potential contaminant source inventory. There is a potential for spills of hazardous materials from traffic accidents in this area. We concur with this assessment and will include the highway as a potential contaminant source in the plan update in December 2004. In the interim, the information in this letter will be incorporated into the existing plan by reference.

3.1 List Potential Contamination Sources

Highway 275 is the entrance road to the Park. Inside the Park, the highway becomes a one-way loop road as shown in Figure 2 of the original plan. There is no through traffic, any vehicles entering the park on Highway 275 must eventually exit the park on Highway 275. Thus, the only vehicles using this road will be park staff and visitors in cars, pickup trucks, or recreational vehicles. There are occasionally commercial delivery trucks delivering materials to the park. These deliveries would be primarily gasoline or diesel fuel. There is a potential for any of the vehicles traveling this road to be involved in an accident, spilling gasoline, diesel fuel, and other automotive-related fluids.

5.0 Management Program for Existing Potential Contamination Sources

Natural Bridges is located in San Juan County. The County has an Emergency Response Group to respond to traffic accidents and effectuate a cleanup of spilled materials. The Park is a participant in the Emergency Response Group. Depending on the amount of material spilled and the response time, it may be necessary to excavate and remove contaminated soil from the accident site. In an extreme event, it may be necessary to undertake further remedial actions to capture and treat spilled material from the spill site. If necessary, downgradient monitor wells will be constructed to determine if contaminants are moving toward the water supply wells.

11.0 Public Notification

The attached public notification will be provided to all residents and employees at Natural Bridges National Monument. The notification may be by paper copy or email, at the park's discretion. Notification will be completed by January 31, 2002.

Let me know if you have additional questions or concerns regarding the Drinking Water Source Protection Plan for Natural Bridges National Monument, System No. 19044. My phone number is (970)-225-3515.

Sincerely,

Larry Martin

Larry Martin
Hydrogeologist

Public Notification
Drinking Water Source Protection Plan
Natural Bridges National Monument

Water supplies for Natural Bridges National Monument are obtained from two deep wells located south of the park entrance road. The wells are 700 and 750 feet deep and are completed in the Cedar Mesa Sandstone Formation. The water table in this area is generally 500-550 feet below ground surface.

There are no other wells within several miles of Natural Bridges. There is very little hydrogeologic information available for the area. We are not able to accurately depict groundwater flow paths or source areas for recharge to the groundwater system. Therefore, following guidance from Utah Department of Environmental Quality, we assume that any potential contaminant sources within two miles of the wells could potentially affect the drinking water supply. The primary contaminants within that area are; chemicals and fuel stored in the park's maintenance area, anything that is flushed into the sewer system, and spills resultant from traffic accidents.

The following procedures have been implemented to reduce the potential for contamination of the ground-water resources and drinking water supply at Natural Bridges National Monument.

1. Upgrade the diesel storage tank, including installation of a modern leak detection system.
2. Install double-wall discharge lines from the diesel storage tank.
3. Continue leak detection monitoring at the diesel fuel and gasoline storage tanks.
4. Provide secondary containment for all fuel, oil, and solvent containers.
5. Continue periodic inspection of areas where paint, solvents, etc. are stored in the maintenance area.
6. Purchase paint, solvents, etc. on an as-needed basis to reduce quantities stored on site.

The park is a participant in the San Juan County Emergency Response Group, which is responsible for responding to traffic accidents and coordinating cleanup of potential contaminants that might have been spilled at an accident scene.

Park staff and residents are reminded to exercise caution when disposing of any chemicals or potential contaminants. Anything that is dumped on the ground, or flushed down a drain, could potentially find its way into the drinking water supply.

A complete copy of the Drinking Water Source Protection report is available by contacting Joe Joliet, NABR Maintenance Division.

State of Utah
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF DRINKING WATER

Michael O. Leavitt
Governor
anne R. Nielson, Ph.D.
Executive Director
Kevin W. Brown, P.E.
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www.deq.state.ut.us

October 22, 2001

Palma Wilson
Natural Bridges National Monument
HC 60, Box 1
Lake Powell, Utah 84533

Dear Mr. Wilson:

Subject: Drinking Water Source Protection Plan for the following sources of the Natural Bridges National Monument Water System, System No. 19044
Well #2 (Old) Source No. 01
Well #3 (New) Source No. 02

Thank you for developing and submitting the Drinking Water Source Protection (DWSP) Plan for Well #2 (01) and Well #3 (02). These plans are not required for transient systems, so we appreciate your efforts to protect your drinking water sources. The Division of Drinking Water **conditionally concurs** with this plan provided the following items are addressed. We commend you for establishing a program to protect this source from present and future contamination. This plan should be updated often enough to ensure that it reflects current conditions in your protection zones. This includes:

- Ensuring that the delineation of the protection zones is accurate;
- Adding potential contamination sources that have moved into your protection areas;
- Deleting sources that have moved out;
- Updating information about the hazards used at the potential contamination sources facilities and sites; and
- Documenting (in the recordkeeping section of your plan) that each item listed on the implementation schedule was carried out according to the schedule.

The due date for submitting this updated plan to us is December 31, 2004.

Conditions:

Please respond to this letter within 90 days and advise us regarding how you will incorporate the following conditions into your plan. You may respond by letter, instead of resubmitting the plan. If you don't respond, your conditional concurrence will lapse, and you will be required to resubmit your plan.

3.0 Inventory of Potential Contamination Sources

3.1 List Potential Contamination Sources:

- Route 275 is located within the management area. Hazardous materials are likely transported along this route. The hazard posed by an accidental spill of these materials into the groundwater system within the source protection zones suggests that this highway should also be included in the PCS inventory. Land management strategies will need to be planned for all inadequately controlled PCS's. Alternatively, these concerns could also be addressed as part of your Contingency Plan.

Please contact Kate Johnson, of my staff, at (801) 536-4206 if you have questions or concerns about the review of your DWSP plan. To help us serve you more efficiently, please use the water system number for the Natural Bridges National Monument in your correspondence.

Sincerely,

Kenneth Bousfield

for Kevin W. Brown, P.E.
Director

KEJ

cc: Larry Martin, National Park Service, 1201 Oakridge Dr., Ste. 250, Ft. Collins, CO 80525

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March 3, 1849

United States Department of the Interior
NATIONAL PARK SERVICE
Water Resources Division
1201 Oak Ridge Drive, Suite 250
Fort Collins, CO 80525

1-3-01

IN REPLY REFER TO:

Joe Joliet
NABR/HOVE

Enclosed are the Source Water Protection Plans for drinking water supply wells at Hovenweep and Natural Bridges National Monuments. I have enclosed two copies of each plan, one copy for Maintenance Division files and one copy for the general park files. I also sent a copy to the Utah Division of Drinking Water. The distribution list for all copies is below.

If you have any questions or comments on these plans, please direct them to Larry Martin at the National Park Service's Water Resources Division.

Thank you,

Larry Martin
National Park Service
1201 Oakridge Drive, Suite 250
Ft. Collins, CO 80525

(970)-225-3515

larry_martin@nps.gov

Distribution: Park Files
Maintenance Division Files at each park
Mike Hunter, SEUG
John Collins, Public Health Service
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Natural Bridges National Monument

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Contents

Page

Executive Summary ... 1

Introduction ... 2

Delineation Report ... 4

Inventory of Potential Contamination Sources ... 11

Assessment of Potential Contamination Sources ... 13

Management Program for Existing Potential Contamination ... 15

Management Program for Future Potential Contamination Sources ... 15

Implementation Schedule ... 16

Resource Evaluation ... 16

Recordkeeping Section ... 16

Contingency Plan ... 17

References ... 18

Appendices ... 19

Figures

Following Page

1. General Location Map 2
2. Location of Water Supply Wells at Natural Bridges National Monument 2
3. Average Monthly Water Use at Natural Bridges National Monument 3
4. Area within Two Miles of Water Supply Wells 10
5. Potential Contaminant Sources Within Two Miles of the Supply Wells 13
6. Land Ownership adjacent to Natural Bridges National Monument 16

Tables

Page

1. General Water Quality, Well No.2 6
2. General Water Quality, Well No.3 7
3. Hazardous Substances Associated with Each Potential Contaminant Source 11

Appendices

Well Logs

Report of Well Driller

Hydrographs of water levels during well testing

EXECUTIVE SUMMARY

Natural Bridges National Monument obtains its water from two deep wells located near the entrance to the monument. The wells are 700 and 750 feet deep and are completed in the Cedar Mesa Sandstone Formation.

Available information does not allow us to delineate the area of groundwater flow to the well for various travel times, as prescribed by Utah Division of Drinking Water. Hydrologic data is inadequate to determine even the direction of groundwater flow, although it is generally believed that groundwater flow is westerly, toward White Canyon. Therefore, we used the optional two-mile radius for developing this drinking water source protection plan.

There are few potential contaminants in the area. There are no potential contaminant sources in the area that are not under the direct control of the National Park Service.

The following procedures are recommended to reduce the potential for contamination of the ground-water resource and drinking water supply at Natural Bridges National Monument.

1. Upgrade the diesel storage tank, including installation of a modern leak detection system.
2. Install double-wall discharge lines from the diesel storage tank.
3. Continue leak detection monitoring at the diesel fuel and gasoline storage tanks.
4. Provide secondary containment for all fuel, oil, and solvent containers.
5. Continue periodic inspection of areas where paint, solvents, etc. are stored in the maintenance area.
6. Purchase paint, solvents, etc. on an as-needed basis to reduce quantities stored on site.

1.0 INTRODUCTION

Natural Bridges National Monument was established on April 16, 1908 to protect several natural bridges and archeological sites and ruins in the White Canyon drainage north of the San Juan River. The monument is 7636 acres.

Natural Bridges is about 40 miles east of Blanding, Utah. The general location is shown on the map in Figure 1. Figure 2 shows the location of water supply wells relative to other features in the monument.

1.1 System Information

National Park Service
Natural Bridges National Monument
Utah DEQ Number 19044

This is a transient, non-community public water supply system. Wells No. 1 and 2 were constructed in 1964 and Well No. 3 was constructed in 1979.

1.2 Source Information

Well No. 1 was abandoned after just a few months of use in 1964.

Well No. 2 was constructed in 1964. It is 700 feet deep and was drilled entirely in the Cedar Mesa Sandstone Formation. Depth to water in Well No. 2 is approximately 550 feet below ground surface, or an elevation of approximately 5960 feet msl. Well No. 2 is located near the east entrance to Natural Bridges, about 100 feet south of the

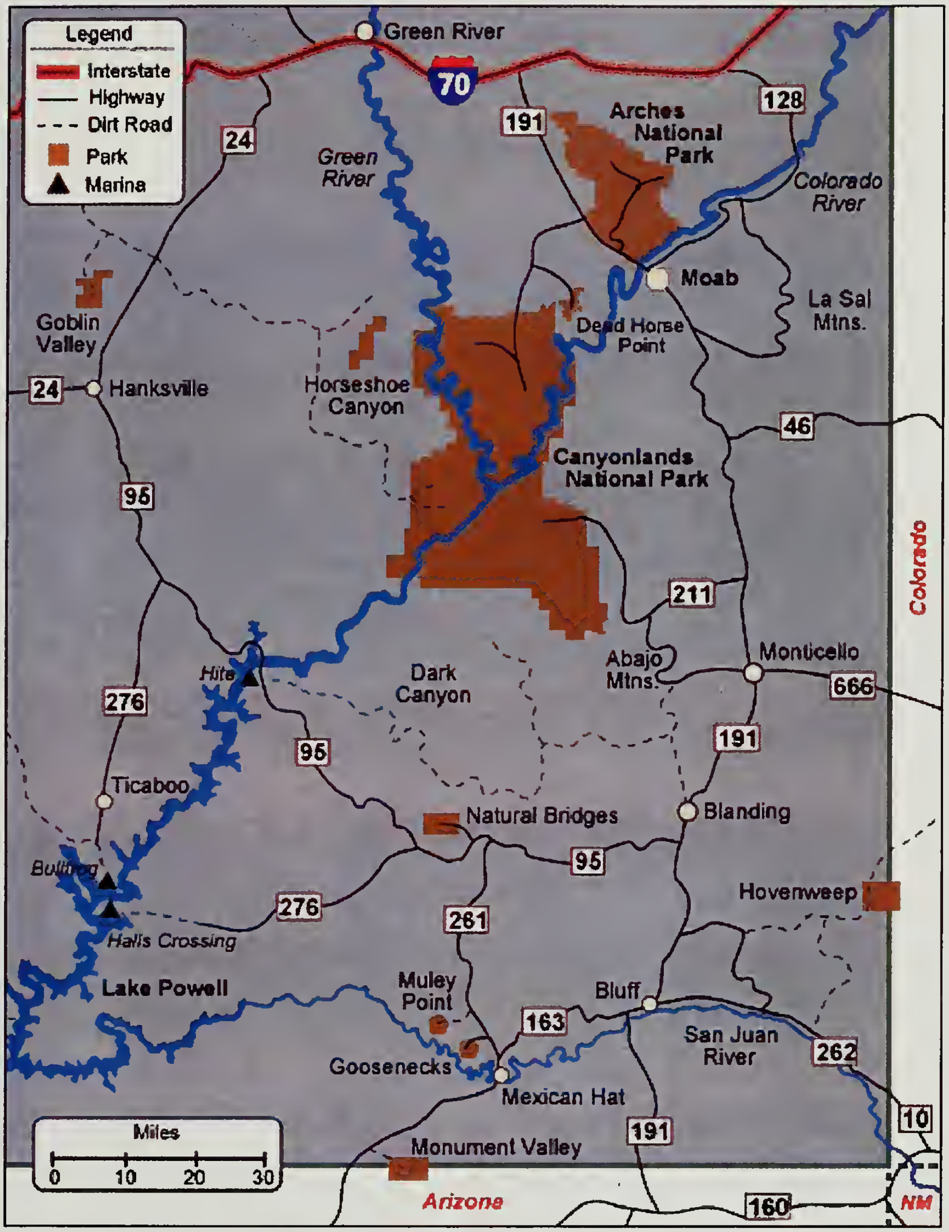


Figure 1. General location map

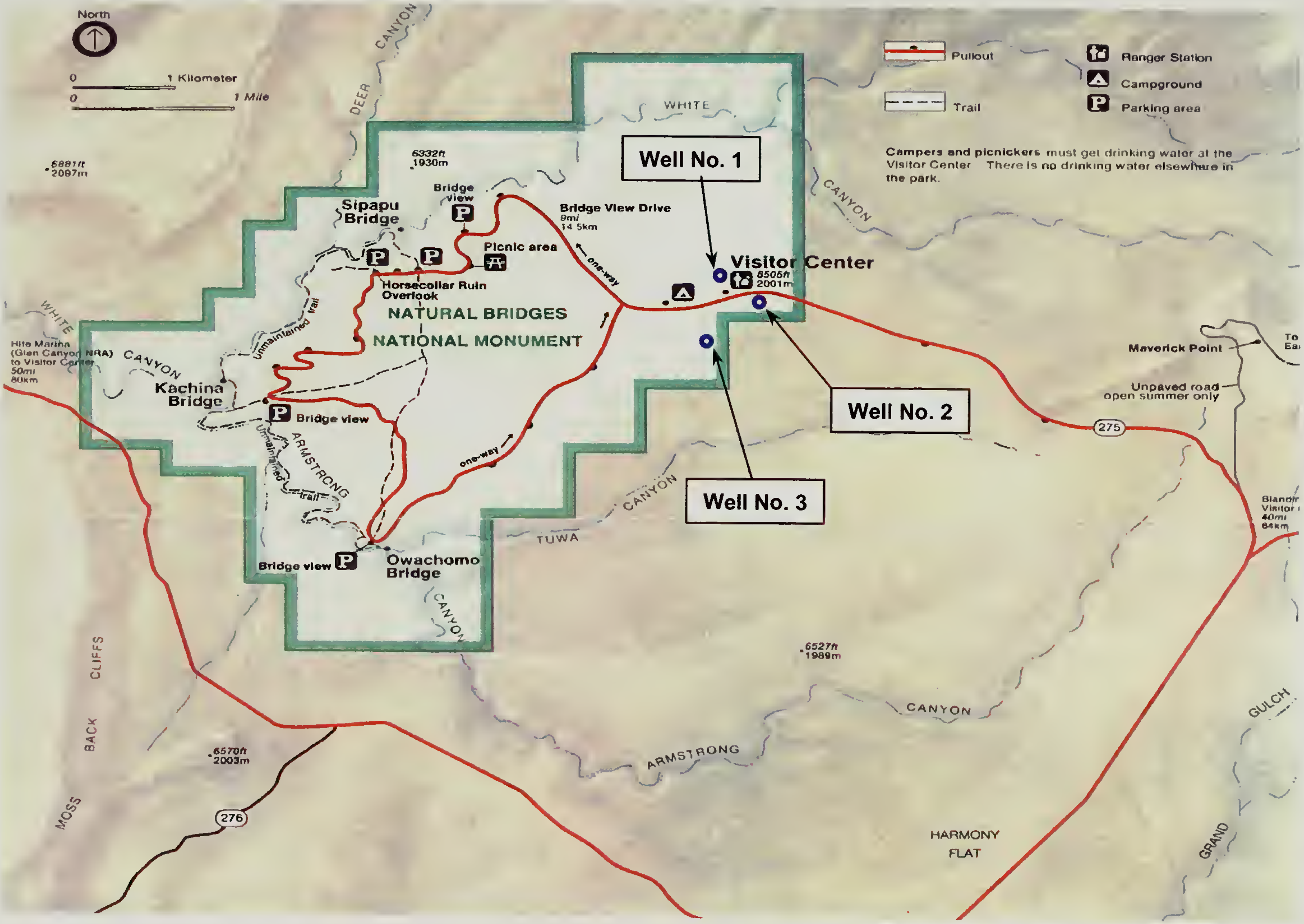


Figure 2. Location of water supply wells at Natural Bridges National Monument

entrance road. The legal location of Well No. 2 is NE¼ of SE¼ of SW¼, Section 31, T36S, R18E. Well No. 2 is the primary water supply for the Monument.

Well No. 3 was constructed in 1979. It is 750 feet deep and was drilled entirely in the Cedar Mesa Sandstone Formation. Depth to water in Well No. 3 is approximately 520 feet below ground surface, or an elevation of approximately 5960 feet msl. Well No. 3 is located near the east entrance to Natural Bridges, about ½ mile south of the entrance road. The legal location of Well No. 3 is SE¼ of NE¼ of NW¼, Section 31, T37S, R18E. Well No. 3 is used as a seasonal supply only in the summer months.

Water is used for drinking and restroom facilities for approximately 130,000 visitors per year. There are 10 employee residences at the park, including single-family and multiple unit dwellings. The wells also supply water for a campground and visitor center. Water use ranges from about 700,000 to 850,000 gallons per year. In winter months, when visitation is low, demand is about 25,000 gallons per month. In summer months, when visitation increases, water demand is about 75,000 to 125,000 gallons per month. Monthly water use at Natural Bridges for 1997-99 is shown in Figure 3.

1.3 Designated Person - R309-113-5:

Owner: National Park Service
Superintendent: Palma Wilson Phone: (435)-692-1234
Operator: Joe Joliet Phone: (435)-692-1234
Address: c/o Natural Bridges National Monument
HC 60, Box 1
Lake Powell, UT 84533

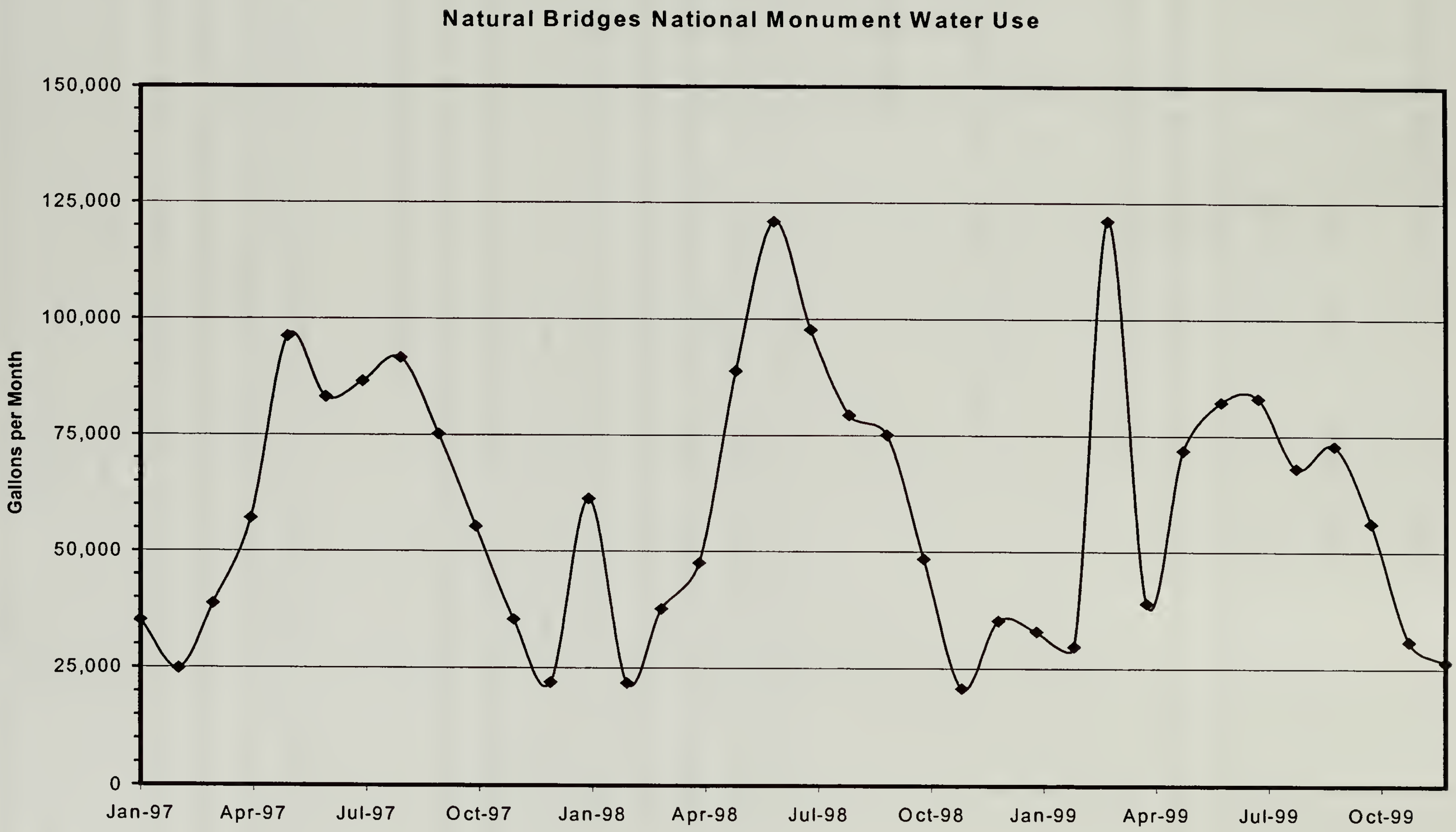


Figure 3. Average Monthly Water Use at Natural Bridges National Monument

2.0 THE DELINEATION REPORT - R309-113-9(5)

The primary sources of hydrogeologic information for this report are an administrative report by the U.S. Geological Survey (Price, 1959) and a report by Huntoon (1977). Both reports were prepared for projects conducted to identify potential locations for water supply wells at Natural Bridges National Monument. There are no other water supply wells within several miles of the site.

2.1 Geologic Data - R309-113-9 (5)(a)(i)

Hydrogeology

The hydrogeology of Natural Bridges National Monument is described by Price (1959) and Huntoon (1977). Natural Bridges National Monument is located on the gently dipping southwestern flank of the Elk Ridge anticline. Geologic formations within the monument are primarily the upper part of the Cedar Mesa Sandstone of the Cutler Formation. These rocks dip to the southwest at 1-2 degrees. Deep canyons dissect the flat-lying rock formations, creating a discontinuous series of plateaus and canyons, and disrupting local groundwater flow paths. The plateaus may contain local groundwater flow systems where recharge is sufficient. Canyons are discharge points for local groundwater flow systems.

The Cedar Mesa Sandstone Member of the Cutler Formation underlies the entire monument and is the only geologic formation underlying the monument that contains fresh water. Deeper formations are known from petroleum tests to contain brines (Huntoon, 1977). Younger formations, such as the Moenkopi and Chinle, occur at higher elevations on plateaus and mesas surrounding the monument. There are some small springs associated with these younger formations. Most of the springs discharge water from the Moss Back Member of the Chinle Formation. These springs are local

flow systems and are not interconnected with the regional groundwater flow system supplying water to the monument's wells.

The Cedar Mesa Sandstone is an indurated, mostly fine-grained and cross-bedded sandstone containing laterally discontinuous lenses of shale and limestone (Huntoon, 1977). The Cedar Mesa Sandstone is about 1200 feet thick under the monument. The upper third of the unit is exposed in White and Armstrong Canyons. The Cedar Mesa Sandstone is uniformly jointed by intersecting sets of vertical fractures throughout the monument and vicinity. No faults, folds, or other structures that would impart fracture permeability to the rocks exist in or near the monument (Huntoon, 1977). Recharge is retarded by laterally discontinuous red shale layers. Price (1959) noted a correlation between the stratigraphic elevations of seeps and hanging gardens in the canyons with the presence of shale lenses.

Water Quality

Water quality data for Well No. 2 are summarized in Table 1. Water quality data for Well No. 3 are summarized in Table 2. Samples collected from Well No. 2 in 1999 were analyzed for a suite of volatile organic compounds, but none were found above detection limits. In general, the water quality is excellent. Water is chlorinated, but no other treatment is necessary.

Table 1. General water quality, Well No. 2

Date	10/07/80	03/24/86	10/28/87	5/20/88
pH	8.3	8.0	7.8	8.4
Turbidity, NTU	0.3	0.2	3.6	1.0
Spec. Cond. (umhos)	655	---	814	740
Hardness ($CaCO_{3)}$	256	305	345	326
TDS (mg/l)	387	---	470	462
Ca (mg/l)	25	70	64	48
Mg (mg/l)	47	32	45	50
Na (mg/l)	58	40	53	51
K (mg/l)	6	5	5	5
HCO_3 (mg/l)	330	372	427	405
SO_4 (mg/l)	80	65	79	79
Cl (mg/l)	4	13	18	14
NO_3 (mg/l)	0.2	0.1	0.03	0.02
TDS (mg/l)	387	---	470	462
Iron (mg/l)	0.03	<0.03	0.99	0.15
Arsenic (ug/l)	<1	<0.5	<1.1	<1
Cadmium (ug/l)	<1	<1	<1	<1
Manganese (ug/l)	10	10	20	8
Mercury (ug/l)	0.1	<0.1	<0.2	<0.2
Selenium (ug/l)	<1	<0.5	<0.5	3.5

Table 1. General water quality, Well No. 3

Date	06/14/79	06/07/85	03/24/86	06/07/86	05/20/88	06/22/88	08/13/91
pH	8.4	---	7.9	7.8	8.2	8.1	8.0
Turbidity, NTU	4.2	0.5	17	1	23	2.4	4.6
Spec. Cond. (umhos)	763	795	---	---	760	810	808
Hardness ($CaCO_3$)	340	353	323	325	321	345	262
TDS (mg/l)	480	478	---	---	466	468	476
Ca (mg/l)	64	75	72	64	61	69	29
Mg (mg/l)	43	40	35	40	41	42	46
Na (mg/l)	53	57	50	53	53	54	55
K (mg/l)	6	4	5	5	4	5	5
HCO_3 (mg/l)	410	412	417	416	362	425	430
SO_4 (mg/l)	84	84	68	80	83	81	78
Cl (mg/l)	15	23	23	21	24	23	14
NO_3 (mg/l)	0.1	<0.01	0.01	<0.01	0.05	0.01	0.05
TDS (mg/l)	480	478	---	---	466	468	476
Iron (mg/l)	0.5	0.54	5.07	0.07	3.3	0.31	0.44
Arsenic (ug/l)	<2	<0.5	<0.5	<0.5	<1	<1	<5
Cadmium (ug/l)	<1	<1	<1	<1	<1	<1	<1
Manganese (ug/l)	120	80	90	10	81	40	51
Mercury (ug/l)	0.1	<0.1	<0.1	<1	<0.2	<0.2	<0.2
Selenium (ug/l)	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<5

2.2 Well Construction Data - R309-113-9 (5)(a)(ii) & (iii)

The original water supply well for the monument (Well No. 1) was constructed in 1964. It was 10-inch hole drilled to a depth of 1327 feet below ground surface. Saline water was encountered in the deeper formations and the well was plugged back to 640 feet below ground surface. The $6^5/_8$" casing was perforated from 285-300 and 532-632 feet below ground surface. The well yielded 2½ gpm with 55 feet of drawdown after 48 hours of pumping. The pump became inoperative after a few months. The pump was pulled and found to be packed with sand. Subsequent work on the well determined that

it had gone dry for some unexplained reason. The well was abandoned, but there is no information regarding whether it was properly plugged and sealed. Park staff have not been able to locate the well.

The two water supply wells at Natural Bridges National Monument are constructed entirely within the Cedar Mesa Sandstone unit of the Cutler Formation. The wells penetrate approximately the upper half of the Cedar Mesa Sandstone. Well construction information is provided on the well driller's reports included in the appendix of this report.

Well No. 2 is 700 feet deep. It was constructed in 1964 by drilling a 10-inch borehole and installing $6^5/_8$" casing for the entire depth. The casing was perforated from 270-280 feet and 539-689 feet below ground surface. Well No. 2 produces 8 gpm with about 85-90 feet of drawdown.

Well No. 3 is 750 feet deep. It was constructed in 1979 with 8-inch casing for the entire depth. The casing was perforated with 20 perforations from 250-540 feet and 400 perforations from 540-750 feet below ground surface. Well No. 3 produces 5 gpm. We have no information regarding drawdown in Well No. 3.

2.3 Aquifer Data - R309-113-9 (5)(a)(iv)

Well No. 2 was completed and tested for yield and drawdown in October 1964. A step drawdown test was conducted at rates of 4 gpm for 6 hours, 5 gpm for 6 hours, 6 gpm for 11 hours, and 7.9 gpm for 6.5 hours. Total drawdown at the end of the test was 88'-8". Recovery occurred to within 2 feet of the static level in 10 hours and total recovery occurred within 24 hours. A second test was conducted at a pumping rate of 7.9 gpm for 6 hours. Total drawdown during the second test was 85'-3". Recovery occurred to within

8 feet of static level within 2 hours, to within 3 feet of static level in 4 hours, and to within 6 inches of static level after 10 hours of recovery.

Static water level measurements in Well No. 2 include the following;

October 1964	554' 9"
June 1980	533' 2"
January 1985	564'
November 1985	562'
February 1991	558' 6"

Well No. 3 was completed and tested in May 1979. It was pumped at 10 gpm for 24 hours. We have no information for drawdown during this test. It was noted that the water level recovered to 534 ft in 2-1/2 hours.

Water level measurements in Well No. 3 include the following;

May 1979	520'
June 1980	588' measured after pump was off for 1¼ hours
February 1991	535'
August 1999	535'

NPS staff attempted to conduct drawdown and yield tests at these wells in August 1994. We were unable to measure water levels in the wells using either a steel tape or an electrical water level meter. The airlines installed in the wells were inoperable. Thus, we were unable to conduct drawdown tests. Problems associated with measuring water levels in wells are more difficult at Natural Bridges due to the extreme depth to water, more than 500 feet below ground surface.

2.4 Hydrogeologic Methods, Procedures, and Calculations - R309-113-9 (5)(a)(vii)

Data collected during the testing of the wells are not suitable for computation of aquifer parameters; transmissivity, hydraulic conductivity, or storage coefficient. No other wells exist within several (more than 5) miles of the monument. There are insufficient wells in the area to determine the direction of groundwater flow. Since the area is remote and there are few potential contaminant sources, the optional two-mile radius delineation will be used to delineate the wellhead protection area.

2.5 Map Showing Boundaries of the DWSP Zones - R309-113-9 (5)(a)(viii)

Figure 4 is a map showing the area within two miles of the supply well.

2.6 Protected or Unprotected Aquifer Classification – R309-113-9(3) & (6)

These wells do not meet the criteria for classification as a protected aquifer, as described in the Utah DEQ guidelines for source water protection plans. The wells are completed in the Cedar Mesa Sandstone Member of the Cutler Formation. The Cedar Mesa Sandstone outcrops at the surface throughout the monument. There are some laterally discontinuous red shale layers within the Cedar Mesa, but these are not sufficient to protect the aquifer from infiltration of contaminants.

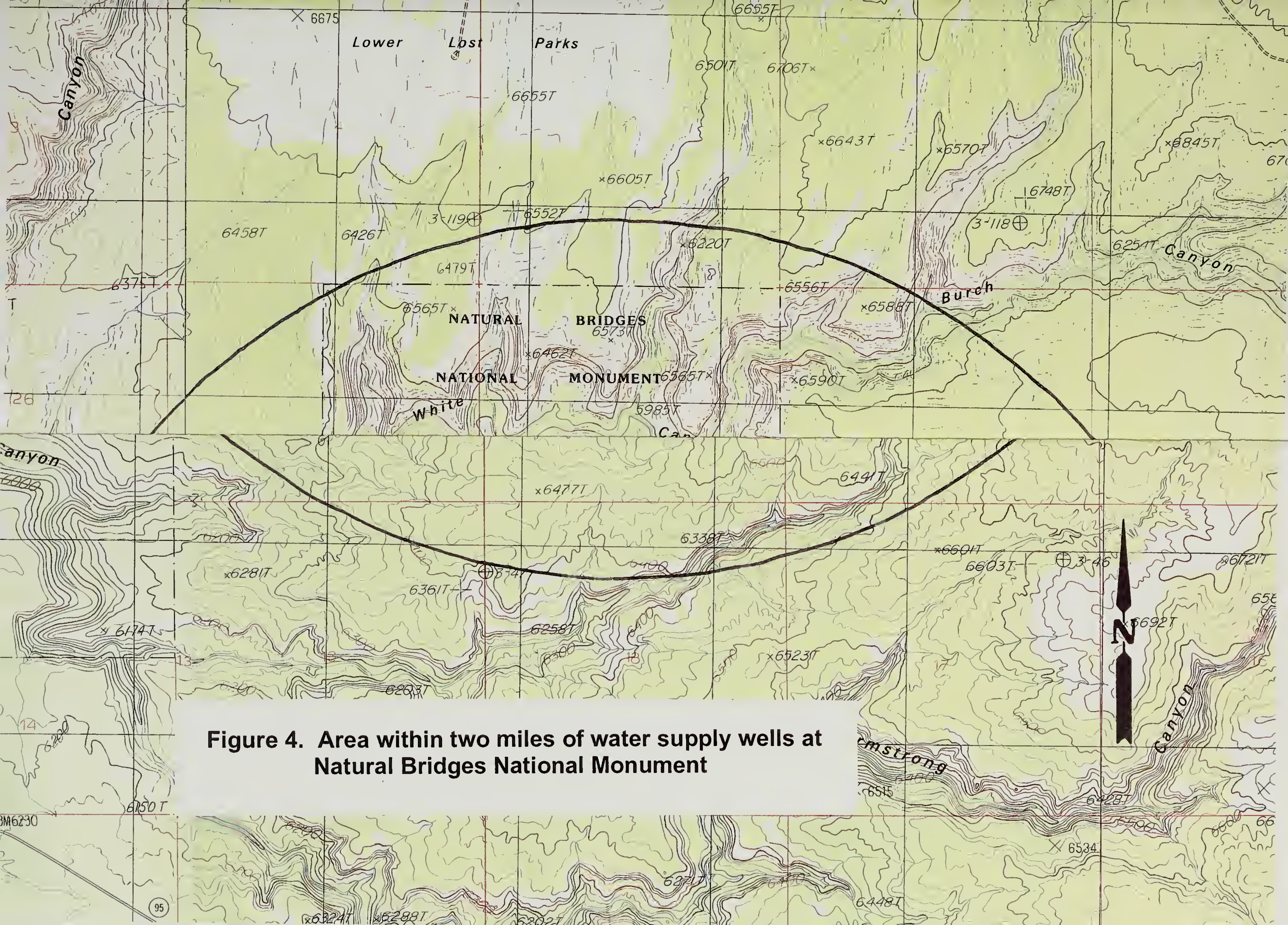


Figure 4. Area within two miles of water supply wells at Natural Bridges National Monument

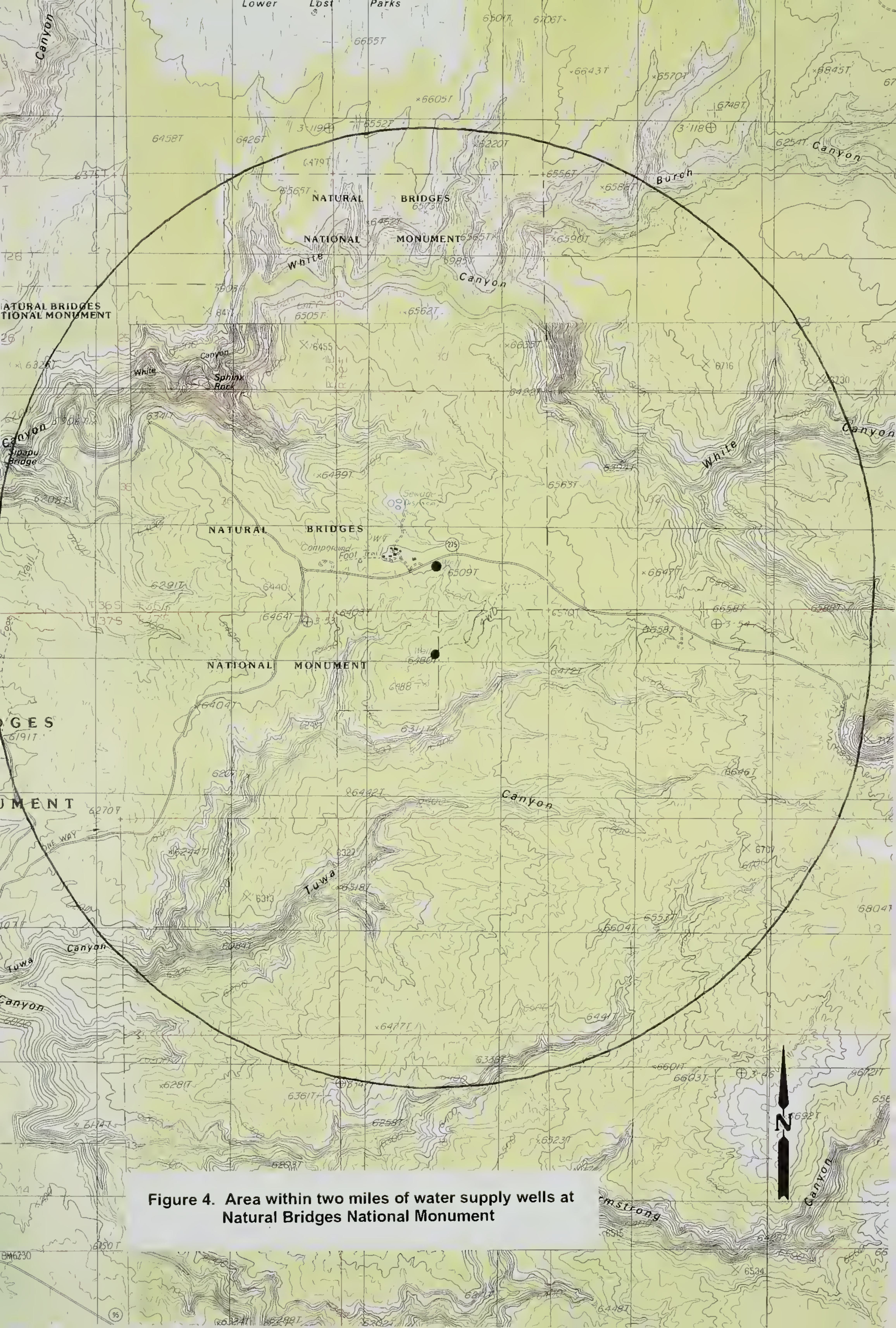


Figure 4. Area within two miles of water supply wells at Natural Bridges National Monument

3.0 THE INVENTORY OF POTENTIAL CONTAMINATION SOURCES - R309-113-10

3.1 List Potential Contamination Sources - R309-113-10 (1)

Potential contaminant sources within two miles of the well include: sewer lines and sewage lagoons, fuel tanks at the park, and small quantities of paint, oil, fuel, solvents, insecticides, and herbicides in the maintenance shop at the park.

3.2 Identify Hazards:

Potential contaminant sources, hazardous substances associated with each of the possible potential contaminant sources, and approximate quantities of each hazardous substance are listed in Table 3.

Table 3. Hazardous substances associated with each potential contaminant source

Potential Source	Hazardous Substances	Approximate Quantity
Fuel Tanks	gasoline	One 250-gallon tank, above ground.
	diesel fuel	One 3000-gallon tank
Sewer lines Sewage lagoons	sewage	Sewage from the visitor center, administrative offices, maintenance area, housing area, and campground is collected and treated at sewage lagoons located about 2000 feet northwest of Well No. 2.
Maintenance shop	solvents, degreasers	Small quantities in 1-5 gallon containers.
	oil, waste oil	Several containers (55 gallons drums).
	paint	Approximately 20 1-gallon cans and 10 5-gallon cans. Two 55-gallon drums of linseed oil.

3.3 Prioritize the Inventory - R309-113-10 (1)

The 3000-gallon diesel fuel storage tank presents the greatest threat to the public water supply at Natural Bridges. The tank is a standard propane type tank converted to use as a fuel storage tank. The monument is planning to replace the tank, upgrading to a double-wall storage tank designed for fuel storage. Discharge lines should also be upgraded to double wall lines as part of that project.

Potential contaminants stored in the Maintenance Shops are used or stored in small quantities. Paint, oil, degreasers, etc. are generally stored on concrete floors, which would provide short-term containment until a spill could be cleaned up. Oil drums and waste oil drums are closed when not in use and contained in spill containers. The day tank for diesel fuel in the generator building does not have a secondary containment. Secondary containment should be provided for this tank.

Sewage lagoons are located about 2000 feet northwest of the nearest well and are topographically about 30 feet lower. Surface drainage at the lagoons is away from the wells. A major break in a sewer line could result in infiltration of sewage into the Cedar Mesa Sandstone. Impacts from such a leak would probably not affect water quality at either well due to the lateral distance between the wells and the administrative areas, depth to water, and the low pumping rates of the wells. Groundwater flow in the monument is probably westerly. The general direction of groundwater flow would transport any contaminants in the administrative area toward White Canyon, away from the water supply wells.

3.4 Potential Contamination Source Location - R309-113-10 (1)

The fuel storage tank and various containers of paint, oil, fuel, degreasers, etc. at the Maintenance Shop are located approximately 1000 feet west from Well No. 2 and 2000 feet north from Well No. 3. There are no other potential contaminant sources within two miles of the well other than those under the direct control of the National Park Service.

3.5 Potential Contamination Sources Plotted on Map

Potential contamination sources are plotted on the map in Figure 5.

4.0 THE ASSESSMENT OF POTENTIAL CONTAMINATION SOURCE HAZARDS

There are no potential contamination sources that are not under the direct control of the National Park Service. Surface drainage at the locations of potential contaminants is away from the water supply wells. Depth to the water table at the monument exceeds 500 feet.

There are no concentrated sources or large volumes of potential contaminants within two miles of the well. The area is remote and rural. Land use is primarily grazing and visitor use at the monument. Potential contaminants at the park are primarily associated with the maintenance shop, including fuel storage tanks. Solvents, degreasers, paint, and similar materials (which might be classified as hazardous) are purchased and stored in small quantities, reducing the potential for release of large quantities of contaminants.

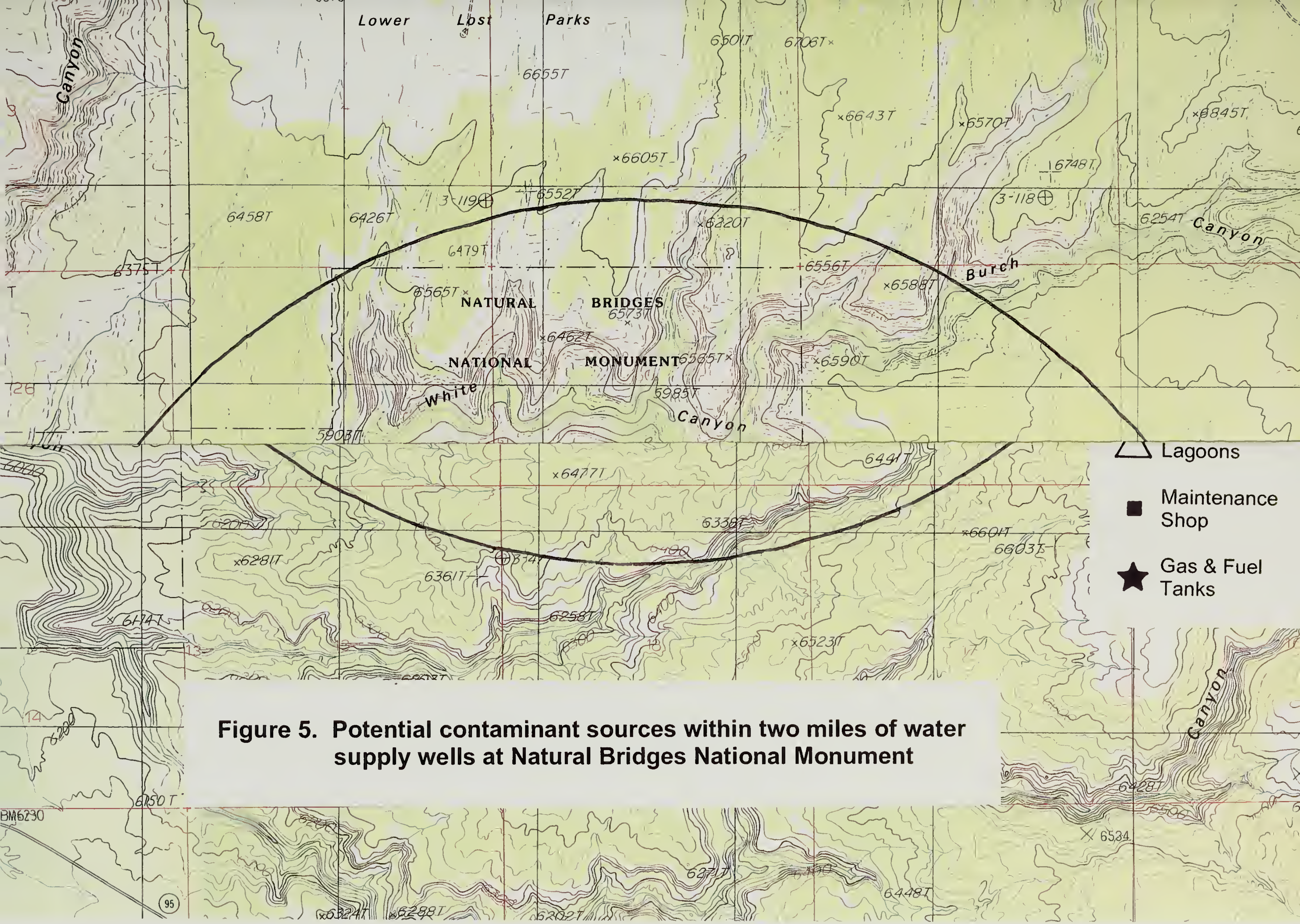


Figure 5. Potential contaminant sources within two miles of water supply wells at Natural Bridges National Monument

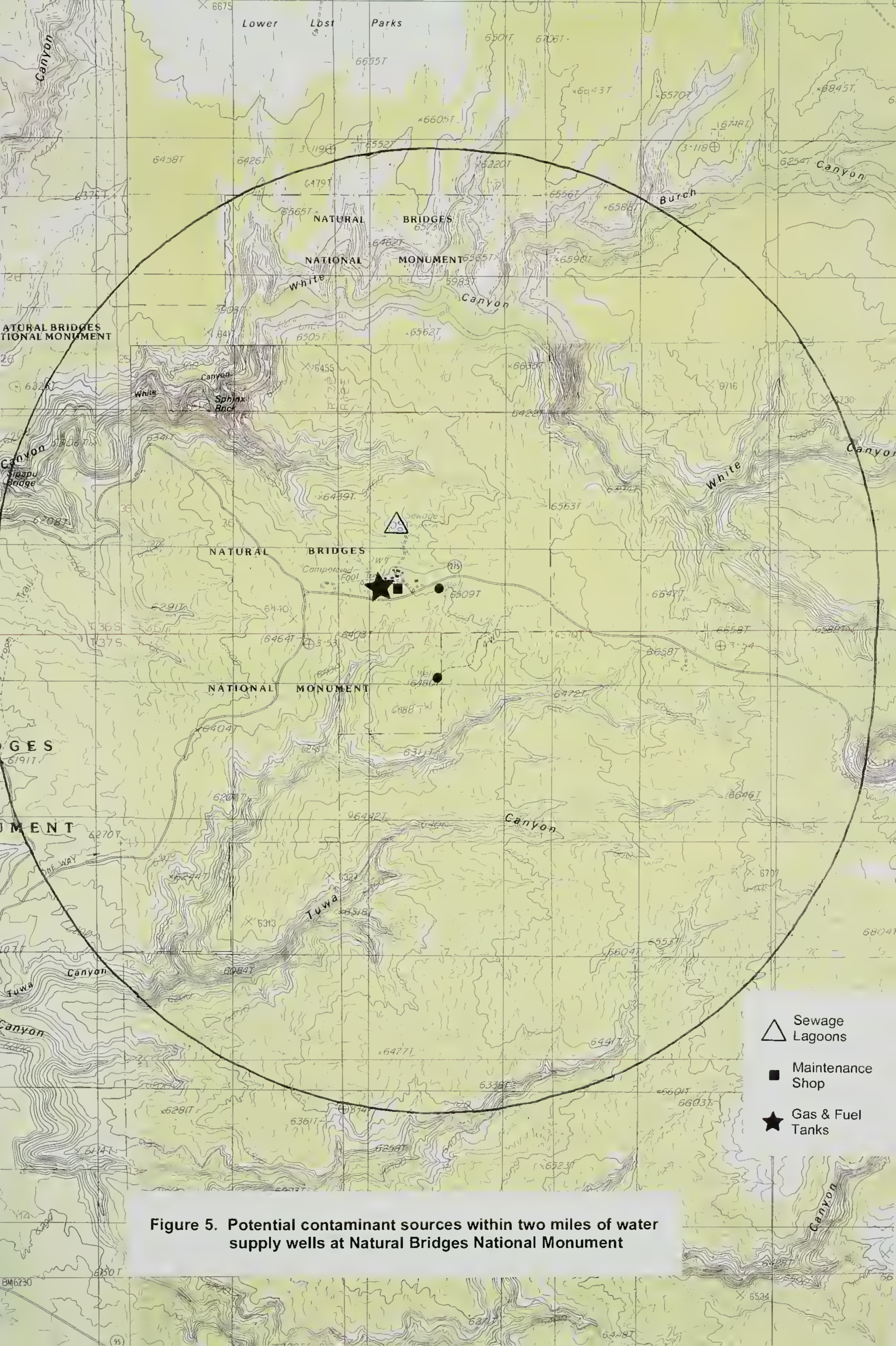


Figure 5. Potential contaminant sources within two miles of water supply wells at Natural Bridges National Monument

Potential contaminant sources are adequately controlled through a combination of hydrogeologic conditions and regulatory, operational, physical, and negligible quantity controls.

The monument is in compliance with all state and local regulations related to the operation and maintenance of the fuel storage tanks and the sewage collection and treatment system.

The park will continue to follow Best Management Practices to prevent or control release of potential contaminants. These practices include routine monitoring of fuel storage tanks, secondary containment vessels for fuel tanks and oil drums, and eliminating large inventories of potential contaminants. Paint, solvents, cleaning supplies, etc. will be purchased in small quantities on an as needed basis.

Physical controls utilized at Natural Bridges include secondary containment vessels for oil and fuel storage containers. Paint, solvents, cleaning fluids, and similar materials are stored on shelves in buildings with concrete floors. There are no floor drains in areas where potential contaminants are stored.

Paint, solvents, cleaning fluids, herbicides, pesticides, etc. are purchased on an as needed basis. Only negligible quantities are stored on site.

Potential hazards at this site are adequately controlled and no further land management strategies will be planned or implemented, unless conditions change.

5.0 THE MANAGEMENT PROGRAM FOR EXISTING POTENTIAL CONTAMINATION SOURCES - R309-113-11

In general, existing regulatory, operational, physical, and negligible quantity controls are adequate to prevent the accidental spill or release of potential contaminants. Recommendations for minor changes at the site are in the last paragraph of this section.

Contents of the fuel storage tank are routinely monitored. The tank is above ground so any leakage would be readily apparent. The sewage collection system and lagoons are constructed to comply with applicable state and local regulations and standards. Oil, fuel, solvents, paint, etc. stored in the maintenance shop are limited to quantities that will be used within a reasonable time. These materials are stored on shelves or a concrete floor. Spills or leaks are readily apparent and cleaned up in an appropriate manner.

The discharge lines from the diesel fuel storage tank should be replaced with a double-walled line to reduce the risk of leaks. All fuel and oil storage tanks or drums at the site should have secondary containment vessels to reduce the risk of spills or leaks.

6.0 THE MANAGEMENT PROGRAM FOR FUTURE POTENTIAL CONTAMINATION SOURCES - R309-113-12

6.1 Management Program - R309-113-13 (4)

If there are any proposed changes to current land use and land management practices within two miles of the well, the National Park Service will review those proposed changes to determine whether the proposed change might have a deleterious impact

on the water supply for the park. No such changes are anticipated, as the area is remote and rural.

The monument is surrounded for several miles in all directions by public land. Most of the adjacent public land is federally owned and managed by the BLM. There is also some state-owned land. Land ownership in the surrounding area is shown on Figure 6.

7.0 THE IMPLEMENTATION SCHEDULE - R309-113-7 (1)(e)

No new land management strategies will be implemented under this plan. The aquifer supplying water for Natural Bridges National Monument is adequately protected by hydrogeologic conditions and regulatory, operational, physical, and negligible quantity controls.

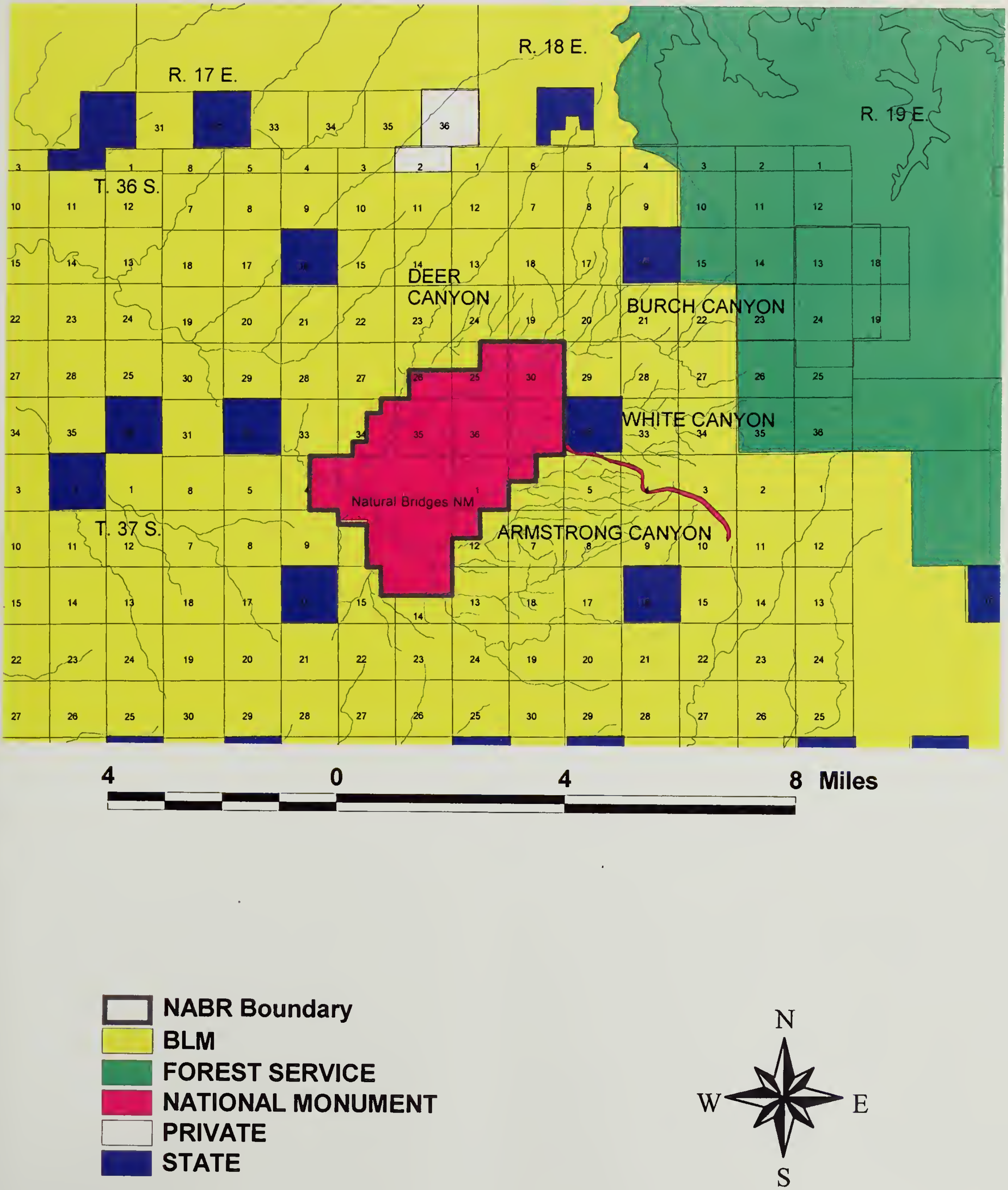
8.0 THE RESOURCE EVALUATION - R309-113-7 (1)(f)

No additional financial or other resources will be required to implement this Drinking Water Source Protection Plan. All potential contaminant sources are adequately controlled. Land use and ownership in this remote area makes it likely that no potential contaminant sources would ever be located within the source area for this well.

9.0 THE RECORDKEEPING SECTION - R309-113-7 (1)(g)

This plan was developed by National Park Service staff. The plan will be reviewed and updated, as necessary, in 5 years, December 2005.

Figure 6
Natural Bridges National Monument Property Ownership



10.0 THE CONTINGENCY PLAN - R309-113-14

There are two wells available to supply water to the system at Natural Bridges National Monument. If one well becomes contaminated it would be removed from service and the monument would rely on the other well as its sole source of drinking water. If the aquifer become contaminated, it would be necessary to pipe or truck water from some other source, several miles distant. If only a small part of the aquifer near the well is contaminated, a new well could be constructed a suitable distance away from the contaminated area.

References

Avery, Charles, 1986, Bedrock Aquifers of Eastern San Juan County, Utah, Technical Publication No. 86, Utah Department of Natural Resources, 114 pp.

Huntoon, Peter W., 1977, The Hydrogeologic Feasibility of Developing Ground-Water Supplies in the Northern Part of Canyonlands National Park and Natural Bridges National Monument, Wyoming Water Resources Research Institute and Department of Geology, University of Wyoming, 24 pp.

Price, Don, 1959, Well Site at Natural Bridges National Monument, San Juan County, Utah, USGS Administrative Report, 27 pp.

Taylor, O.J., and Hood, J.W., 1988, Region 3, Colorado Plateau and Wyoming Basins in Back, W., Rosenshein, J.S., and Seaber, P.R., eds., Hydrogeology: Boulder, Colorado, Geological Society of America, The Geology of North America, v. O-2, pp. 51-58

Utah Division of Drinking Water website, http://www.deq.state.ut.us/eqdw/Index.html

Appendices

Well No. 1

Rocky Mountain
Regional Office

OCT 31 '75

Director	
Deputy Director	
NPS Mgmt.	
Administration	
✓ Professional Svcs	
Coop. Activities	
Operations Eval.	
Public Affairs	
EEO	
Mekeel	
Action Taken	

United States Department of the Interior
NATIONAL PARK SERVICE
ARCHES AND CANYONLANDS NATIONAL PARKS
NATURAL BRIDGES NATIONAL MONUMENT
MOAB, UTAH 84532

IN REPLY REFER TO:
D5039

October 29, 1975

Memorandum

To: Regional Director, Rocky Mountain Region
Attention: William Mekeel, Water Resources

From: Superintendent, Canyonlands

Subject: Loss of water in Well #1, Natural Bridges NM

The pump in Well #1 became inoperative after only a few months of infrequent operation. The pump was pulled and found to be packed with sand. It was sent in for inspection and repairs. In the meantime, a well driller was brought in to clean and flush the well. He put down his well stem and found the well apparently dry. He then made four separate attempts to flush out the sand by pumping 1000 gallons of water into the well. On each occasion pressure was lost. After 4000 gallons were pumped in without results, further work was stopped. The well driller is unable to explain what the problem is or what is happening to the water. In any event we are left with a dry well.

This well has, in the past, been used as a secondary water supply but we are now left with only one well and no backup source. Well #2 supplies approximately 8 gallons per minute and its source is in the same strata as Well #1. If for some unknown reason this strata is drying up, we may soon be without water.

We request a study be made of the situation and hopefully a plan of action initiated to come up with a solution.

Peter L. Parry

Peter L. Parry

Well No. 1

Form 113
Examined DEC-16-1964 ACT
Recorded: ... 12-16-64 ACT T.B. ACT.
Inspection Sheet 12-18-64 B.M.
Copied

REPORT OF WELL DRILLER
STATE OF UTAH

Application No. 36105
Claim No.
Coordinate No. (D-36-18)31cdb

#1
ABD

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such report constitutes a misdemeanor.)

Well #1 @ Natural Bridges National Monument - Utah

(1) WELL OWNER:
Name National Park Service
Address Santa Fe, N. Mex -

(2) LOCATION OF WELL: See file
San Juan Ground Water Basin (leave blank)
72°37' 4136. feet from S.E. Corner
of Section 31, T 36 S, R 18 E SLBM ~~W~~ (strike ... words not needed)

(3) NATURE OF WORK (check): New Well ☒
Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandoned, describe material and procedure:

(4) NATURE OF USE (check):
Domestic ☐ Industrial ☐ Municipal ☒ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☒ Driven ☐ Bored ☐

(6) CASING SCHEDULE: Threaded ☒ Welded ☐
6 5/8 " Diam. from +2 feet to 652 feet Gage .280
" Diam. from feet to feet Gage
" Diam. from feet to feet Gage
New ☒ Reject ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☒ No ☐
Type of perforator used Machine
Size of perforations 1/4" inches by 3" inches
perforations from 632' by 5 Rows Around feet to 532 feet
perforations from 300' feet to 285 feet
perforations from feet to feet
perforations from feet to feet
perforations from feet to feet

(8) SCREENS: Well screen installed? Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to
Diam. Slot size Set from ft. to

(9) CONSTRUCTION:
Was well gravel packed? Yes ☐ No ☒ Size of gravel:
Gravel placed from feet to feet
Was a surface seal provided? Yes ☐ No ☐
To what depth? feet
Material used in seal:
Did any strata contain unusable water? Yes ☐ No ☐
Type of water: Depth of strata
Method of sealing strata off:
Was surface casing used? Yes ☐ No ☒
Was it cemented in place? Yes ☒ No ☐

(10) WATER LEVELS:
Static level 545 below land surface Date 9-22-64
Artesian feet above land surface Date

LOG RECEIVED
DEC 16 ,964
STATE ENGIN
OFFICE

(11) FLOWING WELL:
Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS: Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☒ No ☐ If so, by whom? Perry Brothers
Yield: 2½ gal./min. with 53 feet drawdown after 48 hours
Bailer test gal./min. with feet drawdown after hours
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? No ☐ Yes ☒

(13) WELL LOG: Diameter of well 10" inches
Depth drilled 1327 feet. Depth of completed well 650 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

DEPTH		MATERIAL										REMARKS
From	To	Clay	Silt	Sandstone	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	
0	1327			X								See attached Log.

Work started June 30, 1964 Completed Sept 22, 1964

(14) PUMP:
Manufacturer's Name
Type: H. P.
Depth to pump or bowles feet

Well Driller's Statement:

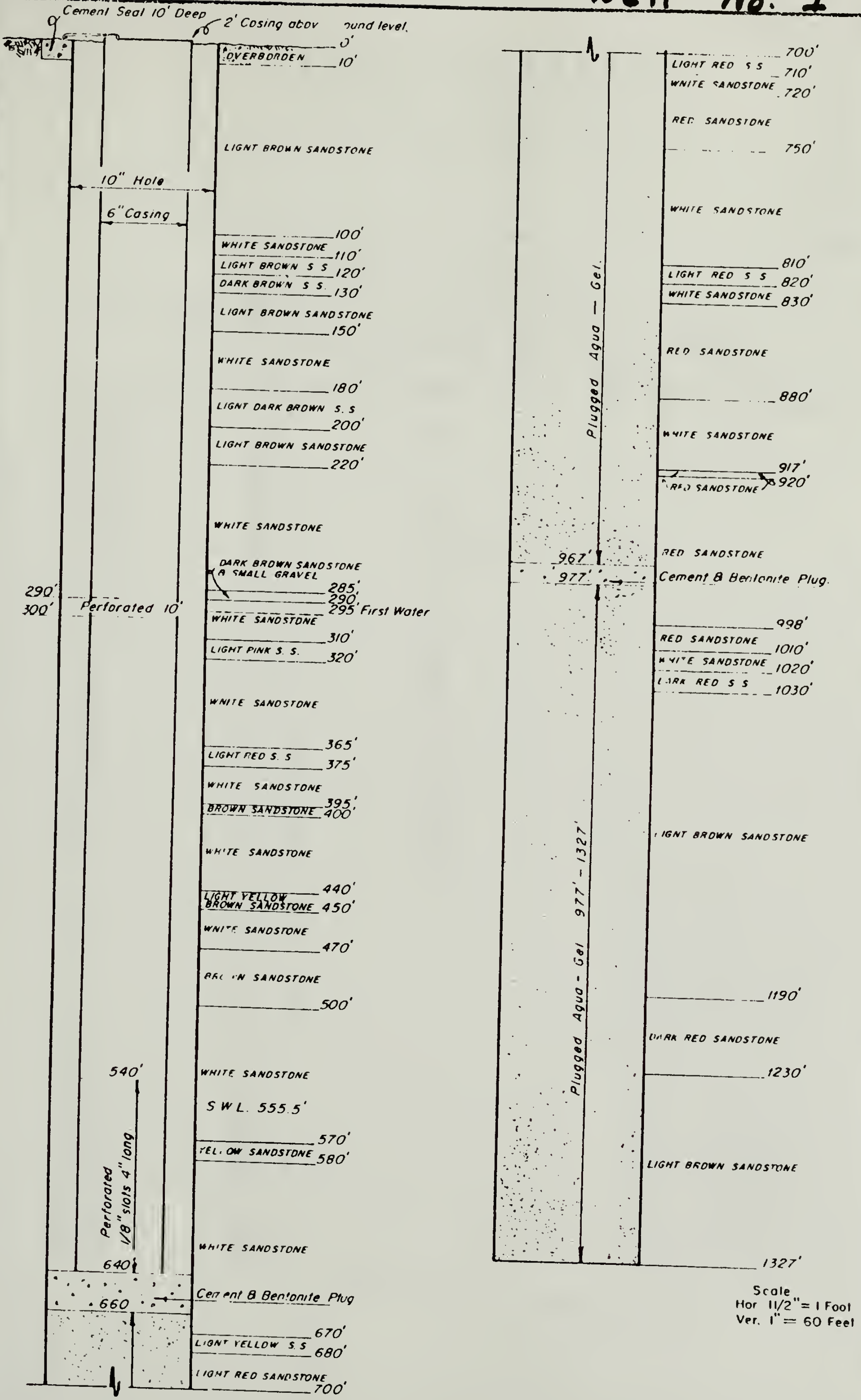
This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name Perry Brothers Drilling Co. (Person, firm, or corporation) (Type or print)
Address 2233 N Navajo Dr. Flagstaff Ariz
(Signed) Lloyd Perry (Well Driller)
License No. 176 Date 12-14, 1964

Copy of Formation & Pump Test
Log to owner attached -

USE OTHER SIDE FOR ADDITIONAL REMARKS

Well No. 1



Scale
Hor 11/2" = 1 Foot
Ver. 1" = 60 Feet

WELL LOG

Well No. 1

By Perry Brothers Drilling Company

NATURAL BRIDGES, NATIONAL MONUMENT

By L. Sando 10/27/65

NM-NB-7109

Well No. 1

PERRY BROTHERS

GEORGE P. — LLOYD C. — RALPH D.
WATER WELL CONTRACTORS
ANY SIZE, DEPTH OR PURPOSE
Phone 774-3841

2033 N. Navajo Dr.
FLAGSTAFF, ARIZONA

Final Test Pumping Results Natural Bridges National Monument
Static water level 545
Total Depth of well 652 feet
Pump Set at 634 feet
Sept 21, 1964 Hole had been bailed to 650 feet to check specific conductance of water, then allowed to recover to 579 feet before start of test.

Time	Water level	GPM	Spec Cond.	Remarks
5:00	579	Start		
5:03	582			
5:06	584 2			
5:16	586 2	3		Clear
5:21	587 10	3½		
5:25	588 9	3		
5:30	589 11	2 3/4	450	
5:36	591	2 3/4		
5:40	592 4	3		
5:45	592 11	3		
5:50	595 [illegible]	3		
5:55	596 4	3		
6:00	597 1	2½		
6:05	597 9	2½		
6:10	[illegible] 2	2½		
6:15	599 3	3		
6:20	600 5	3		
6:25	601 6	3		
6:30	602 5	3		
6:35	602 11	2½		
6:40	603 4	2½	450	
6:45	603 11	2½		
7:00	605 1	2½		5 gal. 13[illegible] sec.
7:15	605 8	2		5 gal. 150 sec.
7:30	608 10			5 gal. 110 sec.
7:45	609 11			5 gal. 145 sec.
8:00	610 4			5 gal. 150 sec.
8:15	612 2			5 gal. 120 sec.
8:30	613 4			5 gal. 120 sec.
8:45	614 8			5 gal. 120 sec.
9:00	616 1		440	5 gal. 125 sec.
9:17	616 6			5 gal. 125 sec.
9:30	617			5 gal. 130 sec.
9:45	618 3			5 gal. 130 sec.
10:00	619 1			5 gal. 135 sec.
10:15	619 5			5 gal. 150 sec.
10:30	619 4			5 gal. 160 sec.
10:45	619 2			5 gal. 160 sec.
11:00	619 4			5 gal. 150 sec.
11:15	619 9			5 gal. 150 sec.
11:30	619 7			5 gal. 160 sec.
11:45	619 3			5 gal. 160 sec.
12:00	618 10			5 gal. 165 sec.

STOP TEST

Recovery Cont'd.

Well No. 1

PERRY BROTHERS
GEORGE P. — LLOYD C. — RALPH D.
WATER WELL CONTRACTORS
ANY SIZE, DEPTH OR PURPOSE
Phone 774-3841
2003 N. Navajo Dr.
FLAGSTAFF, ARIZONA

Record of Recovery - Final test pumping
Natural Bridges National Monument

Sept . 22, 1964

Time	Water Level		
12:00	618	10	STOP TEST
12:01	616	6	
12:02	615	3	
12:03	613	9	
12:04	612	9	
12:05	611	9	
12:06	610	9	
12:07	609	11	
12:08	608	11	
12:09	608		
12:10	607		
12:15	603	6	
12:30	598	2	
12:35	596	1	
12:40	594	4	
12:45	592	5	
1:00	587	3	
1:15	582		
1:30	578	2	
2:40	563	3	
7:30	547	3	
8:05	546	9	

Well No. 2 # 2

REPORT OF WELL DRILLER

STATE OF UTAH

Application No. 36575
Claim No. ____
Coordinate No. ____

IMPORTANT NOTICE: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report must be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports [illegible].)

Contract # 14-10-0333-1276 - Well #2 - Natural Bridges Nat'l Mon - Utah

(1) WELL OWNER:

Name National Park Service
Address Santa Fe, N Mex

(2) LOCATION OF WELL: See File

County ____ Ground Water Basin ____ (leave blank)

North 69°47' — 2913.6 feet from SE Corner
~~South~~ West

of Section 31 T. 36 S, R. 18 E SLB&M (strike out words not needed)

(3) NATURE OF WORK (check):

New Well ☒
Replacement ☐ Deepening ☐ Repair ☐ Abandon ☐

If abandonment, describe material and procedure: ____

(4) NATURE OF USE (check):

Domestic ☑ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☐

(5) TYPE OF CONSTRUCTION (check):

Rotary ☐ Dug ☐ Jetted ☐
Cable ☑ Driven ☐ Bored ☐

(6) CASING SCHEDULE: Threaded ☐ Welded ☐

6 5/8" Diam. from +2 feet to 700 feet Gage .280
____" Diam. from ____ feet to ____ feet Gage ____
____" Diam. from ____ feet to ____ feet Gage ____
New ☐ Reject ☐ Used ☐

(7) PERFORATIONS: Perforated? Yes ☑ No ☐

Type of perforator used Machine
Size of perforations 3/16 inches by 2 1/2 inches
____ perforations from 270 feet to 280 feet
____ perforations from 539 feet to 689 feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet
____ perforations from ____ feet to ____ feet

(8) SCREENS: Well screen installed? Yes ☐ No ☑

Manufacturer's Name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ Set from ____ ft. to ____
Diam. ____ Slot size ____ Set from ____ ft. to ____

(9) CONSTRUCTION:

Was well gravel packed? Yes ☐ No ☑ Size of gravel: ____
Gravel placed from ____ feet to ____ feet
Was a surface seal provided? Yes ☑ No ☐
To what depth? 10 feet
Material used in seal: 3000 PSI Concrete
Did any strata contain unusable water? Yes ☐ No ☑
Type of water: ____ Depth of strata 90
Method of sealing strata off: ____

Was surface casing used? Yes ☐ No ☑
Was it cemented in place? Yes ☐ No ☐

(10) WATER LEVELS:

Static level ____ feet below land surface Date ____
Artesian pressure ____ feet above land surface Date ____

LOG RECEIVED:

(11) FLOWING WELL:

Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS:

Drawdown is the distance in feet the water level is lowered below static level.

Was a pump test made? Yes ☑ No ☐ If so, by whom? Perry Bro.
Yield: 7.8 gal./min. with 88.8 feet drawdown after 30 hours
" ____ " ____ " ____ "
" ____ " ____ " ____ "
Bailer test ____ gal./min. with ____ feet drawdown after ____ hours
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? No ☐ Yes ☐

(13) WELL LOG:

Diameter of well 10" inches
Depth drilled 700 feet. Depth of completed well 700 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

DEPTH		MATERIAL										REMARKS
From	To	Clay	Silt	Sand Stone	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	
0	700			X								Seep @ 270 ½ GPM Water Strata 610-700

Work started 9-23-64, 19__ Completed 10-24, 1964

(14) PUMP:

Manufacturer's Name ____
Type: ____ H. P. ____
Depth to pump or bowles ____ feet

Well Driller's Statement:

This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

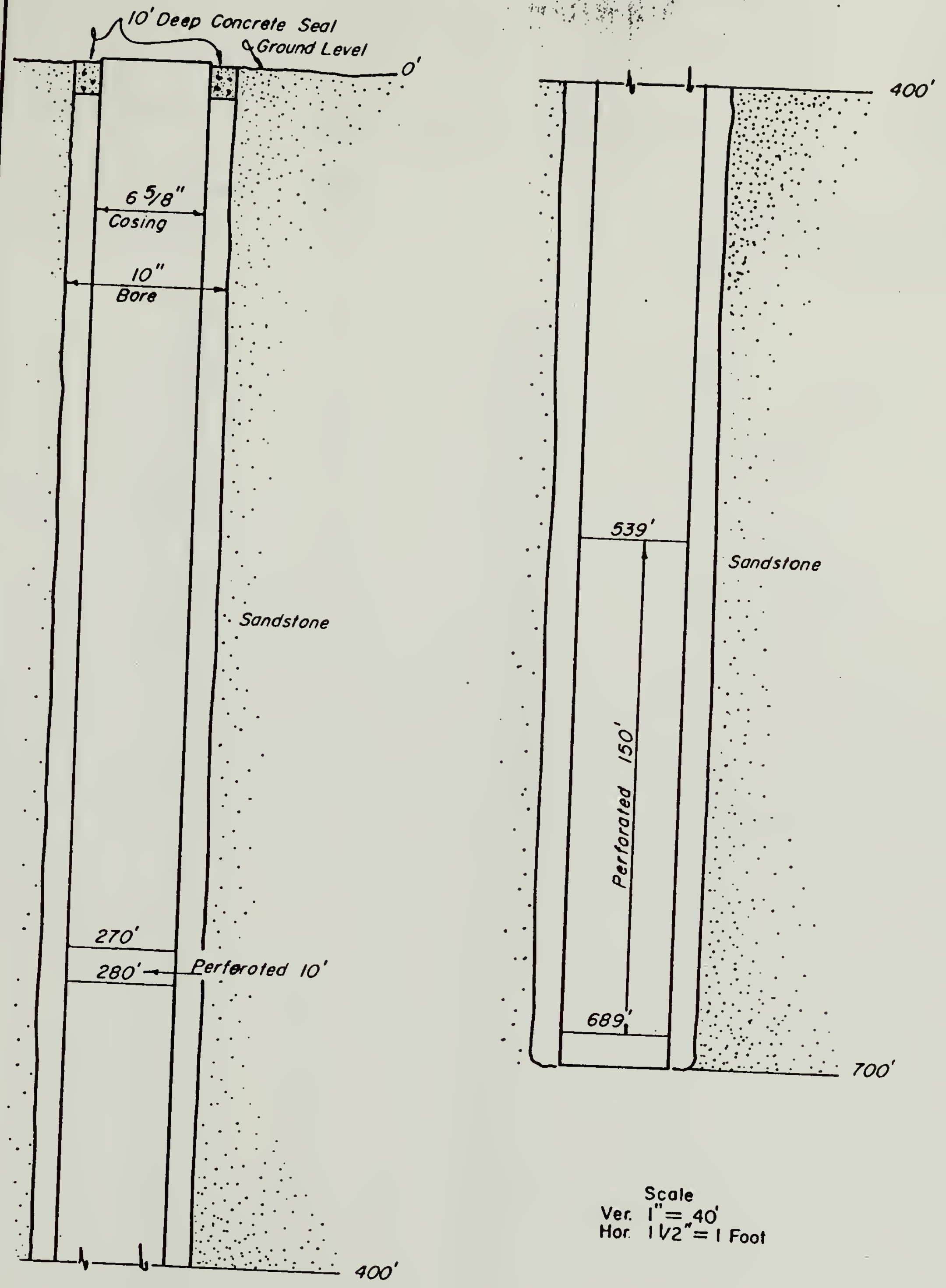
Name Perry Brothers Drilling Co. (Person, firm, or corporation) (Type or print)
Address 2033 N Navajo Dr - Flagstaff, Ariz
(Signed) Ralph L. Perry (Well Driller)
License No. 176 Date 12-18, 1964

USE OTHER SIDE FOR ADDITIONAL REMARKS

Copy of Log
To owner attached

①

Well No. 2



Application No. 36575

WELL LOG

Well No. 2

Started Sept. 23, 1964 & Completed Oct. 24, 1964

By Perry Brothers Drilling Company

NATURAL BRIDGES, NATIONAL MONUMENT

By L. Sando 3/24/65

w/memo 5/14/65

Well No. 2

PERRY BROTHERS

GEORGE P. — LLOYD C. — RALPH D.
WATER WELL CONTRACTORS
ANY SIZE, DEPTH OR PURPOSE
Phone 774-3841

2033 N. Navajo Dr.
FLAGSTAFF, ARIZONA

Test Pumping Well No. 2
Natural Bridges National Monument, Utah
Contract No. 14 10 0333 1276

Date	Time	GPM	Drawdown	Remarks
10/19/64	8:30			Start. Water level, 554'9", Pump Setting 678'8". All measurements from top of casing
	8:38		12'7"	
	8:45	6	14'3"	
	9:00	8	20'8"	
	9:07	4	24'8"	Clear
	9:15	4	24'9"	Clear
	9:30	4	24'3"	
	9:45	4	25'8"	
	10:00	4	26'10"	Clear. S.C. 510
	10:15	4	28' 4"	
	10:30	4	28'11"	
	10:45	4	29'10"	
	11:00	4	31' 1"	
	11:15	4	32'11"	
	11:30	4	33'6"	
	11:45	4	33'9"	SC 510
	12:00	4	33'10"	
	12:15	4	34'2"	
	12:30	4	34'4"	
	12:45	4	34'6"	
	1:00	4	34'6"	
	1:15	4	34'5"	
	1:30	4	34'7"	
	1:45	4	34'8"	SC 500
	2:00	4	34'7"	
	2:30	4	34'9"	Step to 5 GPM
	2:35	5	36'2	
	2:40	5	37'3"	
	2:45	5	38'4"	
	3:00	5	40-1	SC 520
	3:15	5	41-9	
	3:30	5	42-9	
	3:45	5	43-4	
	4:00	5	44-4	
	4:15	5	45	
	4:30	5	45-2	
	4:45	5	45-6	
	5:00	5	45-5	
	5:15	5	45-8	
	5:30	5	46-1	SC 525
	5:45	5	46-6	
	6:00	5	48-1	
	6:30	5	48-10	
	6:45	5	49-2	
	7:00	5	49-5	
	7:15	5	49-5	
	7:30	5	49-5	SC 560
	7:45	5	49-5	
	8:00	5	49-5	
	8:15	5	49-4	
	8:30	5	49-4	Step to 6 GPM
	8:37	6	50-7	
	8:45	6	52-5	
	9:00	6	54-10	
	9:15	6	56-11	
	9:30	6	58-0	
	10:00	6	59-9	

Well No. 2

Date	Time	G.M	Drawdown	Remarks
10/19/64	10:30	6	60'10"	
	11:00	6	61-10	
	11:30	6	62-10	
	12:00	6	63-7	
10/20/64	2:10	6	67-3	
	4:10	6	67-10	
	6:07	6	67-10	
	7:35	7	68-1	SC 600
	8:15	7.5	71-4	
	8:20	7.9	72-9	
	8:40	7.9	77-4	
	9:00	7.5	78-7	
	9:15	7.5	78-9	
	9:30	7.9	80-5	
	9:45	7.9	82-2	
	10:00	7.9	83-6	
	10:17	7.9	84-9	
	10:30	7.9	85-5	
	10:45	7.9	86-0	
	11:00	7.9	86-6	SC 675
	11:15	7.9	86-11	
	11:30	7.9	87-6	
	11:45	7.9	87-8	
	12:00	7.9	87-8	
10/20/64	12:15	7.9	87-10	
	12:30	7.9	88-5	
	12:45	7.9	88-5	
	1:00	7.9	88-8	SC675
	1:15	7.9	88-7	
	1:30	7.9	88-5	
	1:45	7.9	88-7	
	2:00	7.9	88-8	Pump off at 2:00 pm. Drawdown from Static 88'8".

RECOVERY TEST

Date	Time	Elapsed Time	Recovery
10/20/64	2:01	+1	85-5
		+2	82-9
		3	80-3
		4	77-11
		5	75-6
		6	73-4
		7	71-2
		8	69-1
		9	67-2
		10	65-3
		15	57-0
		20	50-7
		25	45-9
		30	41-7
		45	31-5
	3:00	60	24-0
		1:15	18-7
		1:30	14-11
		1:45	12-1
		2:15	8-10
		2:30	7-7
	5:00 pm	3:00	6-2
	6:00 pm	4:00	4-7
	8:00 pm	6:00	3-0
	10:00 pm	8:00	2-4
	12:00	10:00	1-11
10/21/64	6:00 am	16:00	0-9
	12:00 Noon	22:00	0-4
	2:00 pm	24:00	0-0
	4:00 pm	26:00	0-0

Well No. 2

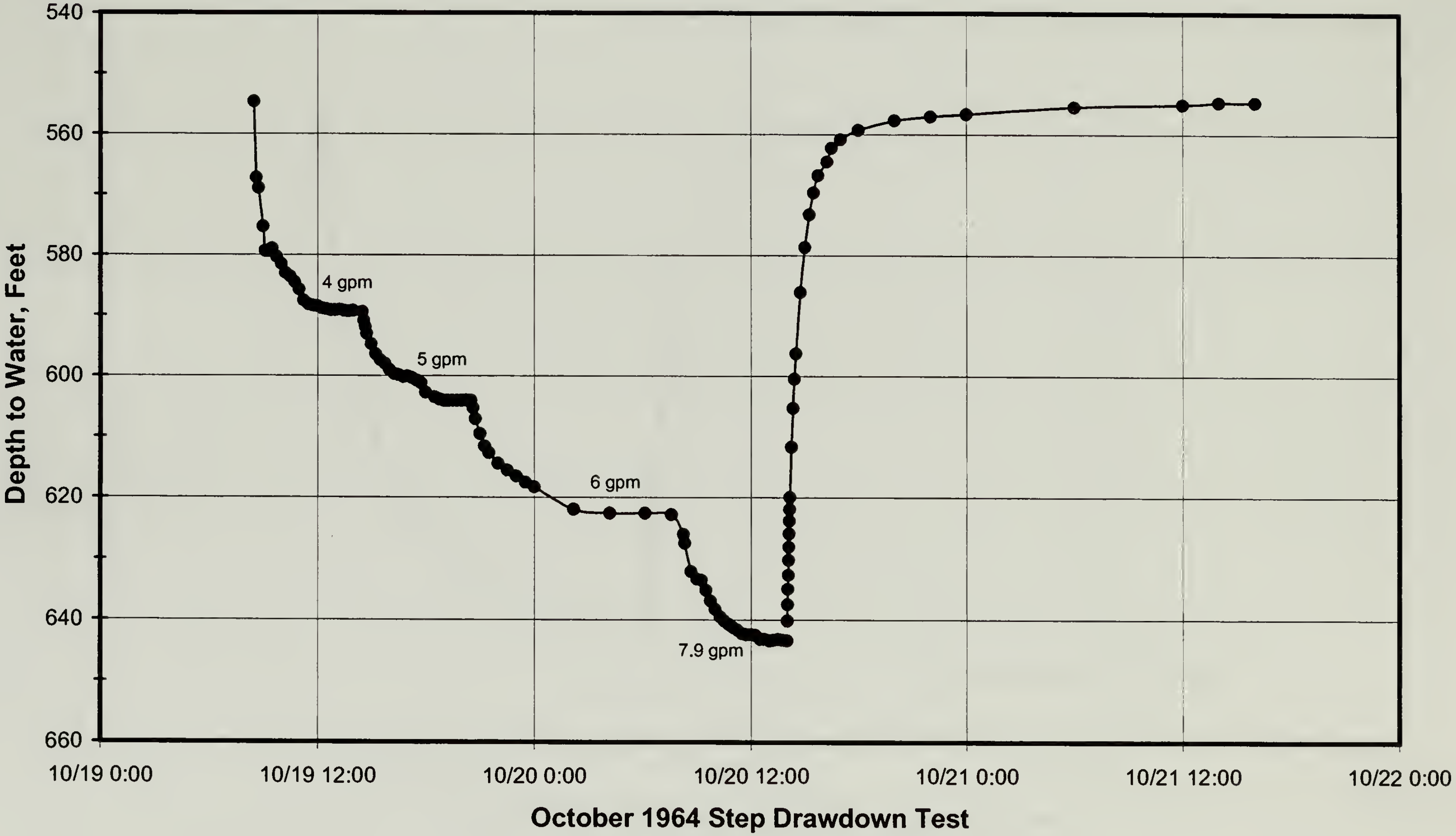
PUMP TEST
October 21,1964

	Time	GPM	Drawdown	Remarks
4:00 pm.	0	Start	0	
	+1	7.9	4-0	
	2		7-4	
	3		8-8	
	4		10-1	
	5		11-6	
	6		12-11	
	7		14-4	
	8		15-9	
	9		17-1	
	10		18-3	
	15		23-3	
	20		28-8	
	25		33-7	
	30		38-3	
	45		48-1	
5:00 pm	60		55-5	
	1+15		60-11	
	1+30		65-9	
	1+45		68-11	
6:00pm	2+00		71-4	
	2+30		75-6	
	3+00		78-6	
	3+30		80-5	
	4+00		81-7	
	5+00		83-7	
10:pm	6+00		85-3	Stop Pump

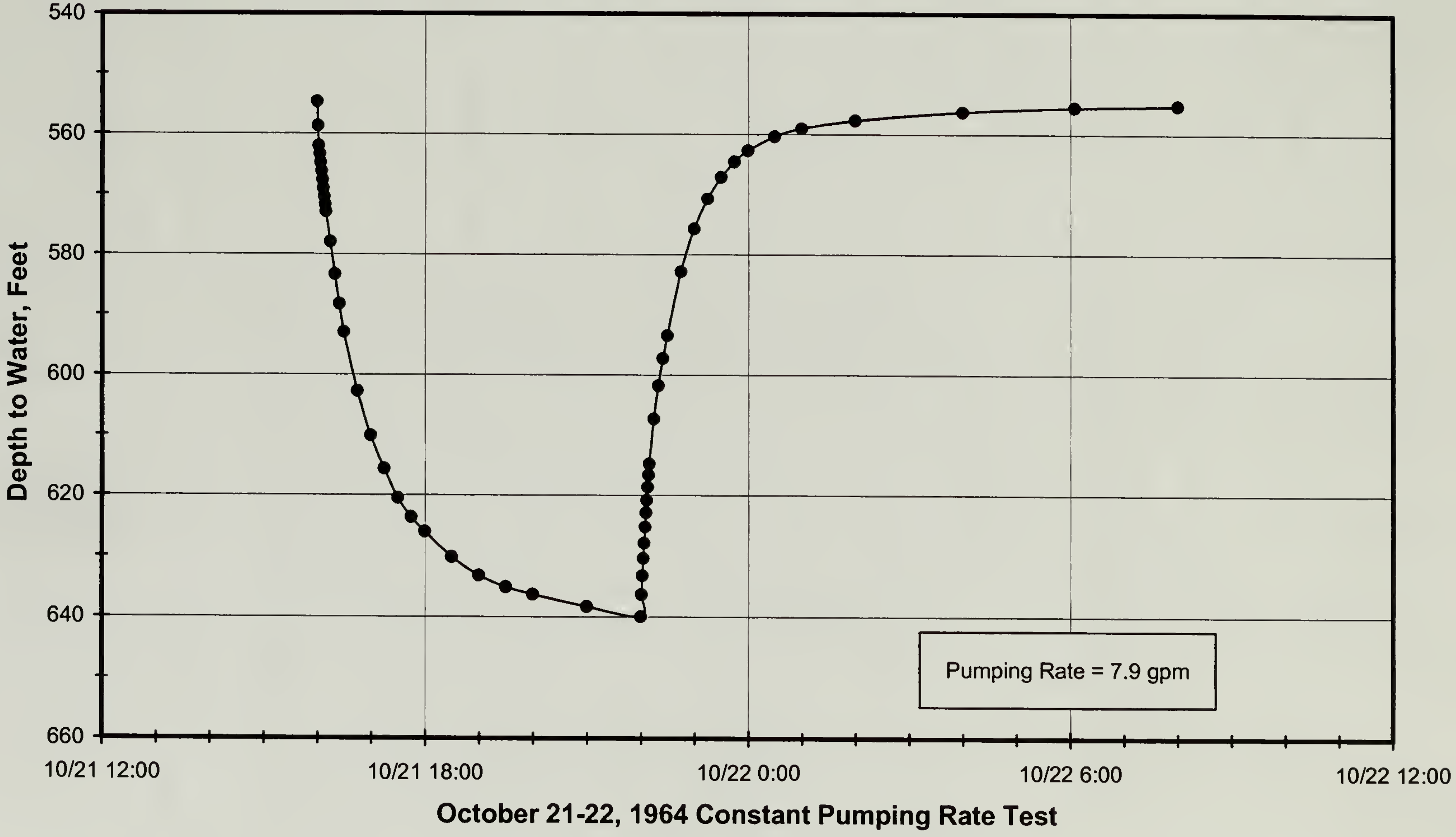
RECOVERY TEST

Date	Time	Elapsed Time	Recovery
10/21/64	10:01	1	81-7
		2	78-6
		3	75-8
		4	73-2
		5	70-6
		6	68-2
		7	66-1
		8	63-11
		9	61-11
		10	60-1
		15	52-7
		20	47-1
		25	42-7
		30	38-9
		45	28-2
		60	21-0
		1:15	16-0
		1:30	12-5
		1:45	9-10
10/22/64	12 midnt	2:00	8-0
		2:30	5-8
	1:am	3:00	4-4
	2:00	4:00	3-0
	4:00	6:00	1-7
	6:05	8:05	0-10
	8:00 am	10:00	0-6

Natural Bridges National Monument
Well No. 2



Natural Bridges National Monument
Well No. 2



Well No. 5

5 For Wel

Form 113—5M—12-60

Examined
Recorded: B. C. T. B.
Inspection Sheet
Copied

REPORT OF WELL DRILLER
STATE OF UTAH

Application No. Test Well
Claim No.
Coordinate No.

GENERAL STATEMENT: Report of well driller is hereby made and filed with the State Engineer, in accordance with the laws of Utah. (This report shall be filed with the State Engineer within 30 days after the completion or abandonment of the well. Failure to file such reports constitutes a misdemeanor.)

(1) WELL OWNER:
Name Nat. Park Ser., Natural Bridges
Address Blanding, Ut.

(2) LOCATION OF WELL:
County San Juan Ground Water Basin (leave blank)
North/South feet, East/West feet from Corner
of Section , T N/S, R E/W SLBM/USM (strike out words not needed)

(3) NATURE OF WORK (check):
New Well ☒
Replacement Well ☐ Deepening ☐ Repair ☐ Abandon ☐
If abandonment, describe material and procedure:

(4) NATURE OF USE (check):
Domestic ☐ Industrial ☐ Municipal ☐ Stockwater ☐
Irrigation ☐ Mining ☐ Other ☐ Test Well ☒

(5) TYPE OF CONSTRUCTION (check):
Rotary ☐ Dug ☐ Jetted ☐
Cable ☒ Driven ☐ Bored ☐

(6) CASING SCHEDULE:
Threaded ☐ Welded ☒
8 " Diam. from 0 feet to 750 feet Gage .322
" Diam. from feet to feet Gage
" Diam. from feet to feet Gage
New ☒ Reject ☐ Used ☐

(7) PERFORATIONS:
Perforated? Yes ☒ No ☐
Type of perforator used Torch
Size of perforations 3/4 x 2 inches by inches
400 perforations from 540 feet to 750 feet
20 perforations from 250 feet to 540 feet
perforations from feet to feet
perforations from feet to feet
perforations from feet to feet

(8) SCREENS:
Well screen installed? Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to
Diam. Slot size Set from ft. to

(9) CONSTRUCTION:
Was well gravel packed? Yes ☐ No ☒ Size of gravel:
Gravel placed from feet to feet
Was a surface seal provided? Yes ☒ No ☐
To what depth? 20 feet
Material used in seal: Concrete
Did any strata contain unusable water? Yes ☐ No ☒
Type of water: Depth of strata
Method of sealing strata off:
Was surface casing used? Yes ☐ No ☒
Was it cemented in place? Yes ☐ No ☐

(10) WATER LEVELS:
Static level 520 feet below land surface Date Same
Artesian pressure feet above land surface Date

LOG RECEIVED:

(11) FLOWING WELL:
Controlled by (check) Valve ☐
Cap ☐ Plug ☐ No Control ☐
Does well leak around casing? Yes ☐ No ☐

(12) WELL TESTS:
Drawdown is the distance in feet the water level is lowered below static level.
Was a pump test made? Yes ☒ No ☐ If so, by whom? Same
Yield: 10 gal./min. with feet drawdown after 24 hours
" Recovered " 534' in " 2 1/2 hrs "
" " " "
Bailer test gal./min. with feet drawdown after hours
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? No ☐ Yes ☐

(13) WELL LOG:
Diameter of well 8 inches
Depth drilled 750 feet. Depth of completed well 750 feet.

NOTE: Place an "X" in the space or combination of spaces needed to designate the material or combination of materials encountered in each depth interval. Under REMARKS make any desirable notes as to occurrence of water and the color, size, nature, etc., of material encountered in each depth interval. Use additional sheet if needed.

DEPTH		MATERIAL										REMARKS
From	To	Clay	Silt	Sand	Gravel	Cobbles	Boulders	Hardpan	Conglomerate	Bedrock	Other	
0	8											Soil
8	34											Br SS
34	40											Hard Red SS
40	52											Br, Yellow SS
52	86											Red SS Hard
86	92											R-B SS
92	168											yellow-Br SS
168	179											Red-Brown SS
179	195											White SS
195	210											Pink-grey SS
210	258				Static 210'							whit SS (water 240')
258	273											White SS Red-Br Shale
273	299											Br - Gr SS
299	330											
330	345											Rd - Br SS
345	375											yellow sandstone
375	382											white SS
382	395											Red SS
395	557											Y - grey SS
557	565											Light Red SS
565	580											white yellow SS
580	597											Pink - grey SS
597	604											grey - white SS
604	614											Light Red SS
614	645											White - Brown SS
645	660											Red pink SS
660	708											Br, white
708	750											purple Br SS

Work started JAN 19, 1979 Completed MAR 6, 1979

(14) PUMP:
Manufacturer's Name
Type: H. P.
Depth to pump or bowles feet

Well Driller's Statement:

This well was drilled under my supervision, and this report is true to the best of my knowledge and belief.

Name The Well Supply Co. (Person, firm, or corporation) (Type or print)
Address Boulder, UT.
(Signed) Wm H Park (Well Driller)
License No. 284 Date MAR 6, 1979

USE OTHER SIDE FOR ADDITIONAL REMARKS